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admirably illustrated, and we venture the prediction that many of these figures will become classic in future texts. No such collection of figures representing the plant kingdom exists, and they give a conception of plants in general that can be obtained from no other publication. The figures and text include not merely those structures which may be said to have taxonomic importance, but anatomical peculiarities of each family are set forth. All through the work the ecological standpoint is prominent, and the sections on geographical distribution are among the most valuable.

It is to be expected that the treatment is unequal, and the different parts of very different degrees of merit, but with fifty-seven collaborators this could not be avoided. It seems to most botanists far more important to complete a work within a reasonable time, and so establish a usable datum-line, than to drag it out indefinitely and allow one part to be out of date before another is published. In general the treatment will be regarded as conservative, there being apparent no desire for change if existing lines can be used at all. In so delicate a matter as nomenclature, as is well known, the "Berlin rules," which are in fact the Engler rules, are drawn up in the spirit of compromise, not going to either extreme, and probably satisfying neither set of extremists. No set of rules proposed, however, has had as yet such a tremendous advantage of general usage as this great work will compel for the Berlin rules.

It is impossible to mention in detail the views advanced as to the evolution of plant groups. There will be much difference of opinion as to minor points, for many smaller groups, through lack of adequate investigation, had to be "lumped," but in the judgment of the reviewer the main lines of evolution suggested will stand, which are in brief as follows: spiral arrangement and indefinite numbers to cyclic arrangement and definite numbers; naked flowers to differentiation of calyx and corolla; apocarpy to syncarpy; polypetaly to sympetaly; hypogyny to epigyny; actinomorphy to zygomorphy. That cases of "reduced flowers" occur there can be no doubt, but that the great majority of so-called cases of reduction are really primitive in character seems hardly less doubtful.— J. M. C.

Ferments and fermentation.

THE attention which the various problems connected with fermentation have received during the past decade and the interest, both theoretical and practical, which attaches to the investigation of these problems make doubly welcome a book on the soluble ferments from the hand of Professor J. Reynolds Green.[1] In it he has sought to bring together, so far as possible, the results already reached, and to indicate the view of the processes of fermentation to which these results point. For it can hardly be said that the results now attained furnish any adequate explanation of fermentation ; though they remove it more completely from the realm of so-called "vital" action, they refer it to the category of equally inexplicable catalytic phenomena.

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[1] GREEN, J. REYNOLDS: The soluble ferments and fermentation. 8vo. pp. xiv + 480. Cambridge: The University Press. 1899. 12 s. [New York: The Macmillan Company.]

After discussing the nature of fermentation and its relation to enzymes, the author gives a detailed account of diastase (60 pp.), inulase, cytase, sugar-splitting enzymes, glucoside-splitting enzymes, proteolytic enzymes (57 pp.), fat-splitting enzymes, clotting enzymes (48 pp.), ammoniacal fermentation, oxidases, alcoholic fermentation, and the fermentative power of protoplasm. The work closes with chapters on the secretion, constitution, and mode of action of enzymes. Of course the treatment of these topics includes a discussion of the discovery, occurrence, preparation, and behavior of enzymes in both animal and plant bodies.

A work like this is not open to adverse criticism. It is rather to be commended without stint. Indeed, every physiologist will be thankful to know and to have at hand this compact but full summary of researches, accompanied, as it is, by an extensive bibliography, leading to further details in the original papers. One notices with pleasure that even the results contradictory to the general trend of investigation are clearly stated. This engenders confidence in the fairness of the work ; a confidence which the closest scrutiny justifies.

The bibliography, which the author modestly says is not exhaustive, is especially to be commended. Its extent will be appreciated when it is stated that it contains about 800 titles! The citations would have been improved had some uniform system been followed. Here is an assortment of five styles taken from p. 449: (1) Zeit. f. Biologie Bd. x. 92 ; (2) Zeitsch. f. klin. Med. I. (1880). 231; (3) Cent. f. Bact. 1891. Bd. 10. 401; (4) Cent. f. Bakt. 15 (1894). 722 ; (5) Ber. d. deut. chem. Gesell. 23 (1890). 3689; (6) Ber. d. deut. chem. Gesell. (1895), 1433. This will be looked upon by many as of small consequence; and so it is, in comparison with the value of the work. But the defect is so unnecessary and so easily avoided that it seems the greater pity that it should mar so good a bibliography. Moreover, calling attention to it here may serve to emphasize a point which many scientific writers sorely need to lay to heart.

Users of this work will be thankful that the editor of the *Cambridge Natural Science Manuals*, of which this is one, had an index prepared, in spite of the author's insistence that one was unnecessary. They will only be sorry that the index is not fuller, and that it does not include the names of authors, for which the bibliography must be consulted.—C. R B